Cryogenic Propulsion

Completed Technology Project (2012 - 2014)

Project Introduction

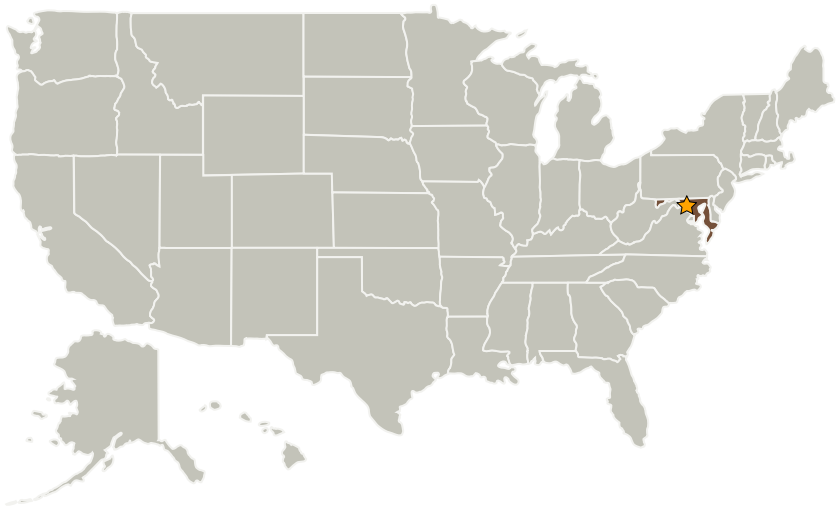
Cryogenic propellants can enhance NASA missions. This project will establish that modern cryogenic storage technologies will allow the use of cryogenic propulsion for extended periods. This project will also result in the increased technology readiness level (TRL) of a vital technology that will enhance in-space cryogen storage.

The storage of cryogenic propellants is challenging because heat leaks into the cryogenic storage tanks no matter how good the insulation, resulting in a necessity to vent and maintain the propellant at the appropriate thermodynamic condition for engine operation and tank safety. Although it is challenging to store LO2, it is even more difficult to store LH2 because of its lower boiling point. There is therefore an increased focus for demonstrating LH2 storage in vent-free conditions.

Anticipated Benefits

Provides substantial mass advantage over the use of a cryocooler.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

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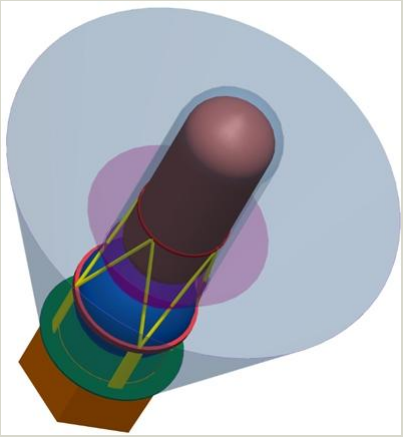
Primary U.S. Work Locations
Maryland

Images



11809-1360345665898.jpg
Cryogenic Propulsion
(https://techport.nasa.gov/image/1637)

11809-1363026410602.jpg
Cryogenic Propulsion
(https://techport.nasa.gov/image/1691)

Links

NTR 1
(http://eNTRe Tracking Identifier: 5025778)

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Organizational Responsibility

Responsible Mission Directorate:
Mission Support Directorate (MSD)

Lead Center / Facility:
Goddard Space Flight Center (GSFC)

Responsible Program:
Center Independent Research & Development: GSFC IRAD

Project Management

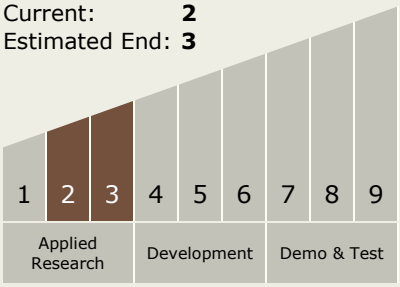
Program Manager:
Peter M Hughes

Project Manager:
Terence A Doiron

Principal Investigator:
Shouvanik Mustafi

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic

Other/Cross-cutting:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems